BUREAU OF LAND MANAGEMENT
TECHNICAL PROTOCOL
FOR THE COLLECTION, STUDY, AND CONSERVATION OF SEEDS FROM NATIVE PLANT SPECIES

for

SEEDS OF SUCCESS

(Revised 4 August 2003)

1. INTRODUCTION

The purpose of the *Seeds of Success* Project in the United States on public lands administered by the Bureau of Land Management is to establish a high quality, accurately identified and well documented native species seed collection at the population level in cooperation with the Royal Botanic Gardens, Kew and to support development of geographically appropriate native plant materials for restoration. Each seed collection should comprise a significant representation of the genetic variation within the sampled population. The collections act as a basis for off site (*ex situ*) conservation and, where and when appropriate, can be used for study and multiplication in the native plant materials development program for restoration purposes. The following information is for the use of botanists collecting for *Seeds of Success* on behalf of BLM. Similar protocols are in place for other partnerships within the *Seeds of Success* program.

The Royal Botanic Gardens, Kew (RBG, Kew) has a worldwide seed collection program called the Millennium Seed Bank (http://www.rbgkew.org.uk/msbp/). It is a multi year project partly funded by the United Kingdom Millennium Commission with a goal of collecting and conserving ten percent of the world's flora (approximately 24,000 species) by the year 2010. The Bureau of Land Management and the RBG, Kew are participating in the *Seeds of Success* program under the terms of a cooperative agreement signed by both parties in May, 2000. BLM agreed to collect seeds for the project and to grant access to the lands we manage for collection; to grant prior informed consent to RBG, Kew for study and long term storage of seeds collected from our lands; to send all seeds, vouchers and field data to Kew for processing, and to send an itemized species list in the ***Notification of Transfer*** (***Appendix 3***) with seeds and herbarium voucher specimens.

RBG, Kew agreed to clean, process, test and store all seed sent by BLM; send half of each collection to the US for long term storage; provide BLM with the results of all testing; fund a fixed term coordinator position in BLM to develop the collection program; and to provide training and advice to BLM during the project.

This protocol sets out the procedures for making collections for *Seeds of Success*. Also, any collections made for native plant materials development should follow this protocol as outlined in IM-WO-2001-184 which states *"We would like to integrate seed collection under the Native Plant Materials Development Program (NPMDP) with the Seeds of Success Project, a 10-year agreement with the Royal Botanical Garden, Kew, to collect and store seeds of 2,000 plant taxa useful for restoration from public domain lands. To this end, and to ensure a consistent methodology for seed collection bureau-wide, seed collected using funding from the NPMDP should follow the protocols established for the Seeds of Success Project. The WO will provide training on the protocols and is working with the Student Conservation Association to place field*

crews trained in the seed collection protocols with field offices beginning with the 2002 field season. We recommend that, to the maximum extent possible, seed collection for NPMDP funded projects be postponed until staff trained in the Seeds of Success collection protocols are available."

2. TARGET SPECIES

The focus of the *Seeds of Success* project in BLM is on collecting species needed for restoration. Other high priority species for conservation and research are also being targeted. Many of the countries that are participating with the Royal Botanic Gardens, Kew center their collections around rare and endangered plant species or crop relatives. But in the US, the Center for Plant Conservation Gardens collect and store the seeds of rare threatened and endangered plant species; and the USDA Seed Storage Laboratory, in Fort Collins, Colorado collects and stores many accessions of crop relatives, mostly from other countries. Neither of these organizations has collected or stored seeds of common native plant species in the past, but both are cooperating now in the *Seeds of Success* program.

The *Seeds of Success* program manages target species information on a website hosted by the *Plant Conservation Alliance* at the http://www.nps.gov/plants/sos website. As ecoregional lists of species are made available, they will be placed on the web for helping to choose targets. Lists of species assigned to collecting group are also available on the web. These lists track which BLM Office or other Kew collecting group is assigned the one collection that can go to Kew.

Species can only be collected once for the Millennium Seed Bank. When a species is collected and sent to RBG, Kew Millennium Seed Bank, it is cleaned, tested for germination and divided. Half of each species stays in long term conservation at the Millennium Seed Bank and half is returned to the United States for long term conservation at the National Seed Storage Laboratory in Fort Collins Colorado.

Although only one sample of each species can be sent to Kew, species that were sent to Kew by one collecting group, can be collected throughout their range by any collecting group and used as part of BLM's native plant materials development program. In 2003, BLM is cooperating with the US Forest Service Region 6 Seed Extractory in Bend, Oregon for cleaning and storing restoration seed collected by Field or State Offices that are also sending seed to Kew.

3. IDENTIFYING PRIORITY SPECIES TO COLLECT

The collecting focus of this project is on species needed for restoration of the public lands and for native plant materials development in the western United States, and conservation of widespread native species. Initial target species lists were determined at the ecoregion level by BLM, PCA, RBG, Kew after consultation with field office staff, the Society for Ecological Restoration, State Heritage Program botanists, non-profit organizations including The Nature Conservancy and state native plant societies, university botanists and ecologists and researchers from botanic gardens that are members of the CPC network. Additions to the priority species list can be proposed by contacting the project coordinators.

Seeds of Success uses the ecoregions outlined by The Nature Conservancy. Collecting targets will include:

- native species needed for ecological restoration work,
- native species of known forage or browse value
- species endemic to an ecoregion, but not considered rare in the ecoregion
- native wild relatives of cultivated or economically important species
- native species with significance to Tribes
- monotypic native species
- native species closely related to rare species not collected in this project.
- native species closely related to non native invasive weed species.
- native species important to pollinators, especially native bees and rare butterflies.
- "flagship" or well known species such as state flowers and trees

4. SPECIES EXCLUDED FROM THIS PROJECT

The collecting focus of the BLM-RBG Kew project is on species needed for restoration of the public lands and for native plant materials development in the western United States, and conservation of widespread native species. The species that will be excluded from the Millennium Seed Bank portion of *Seeds of Success* include:

- Any native plant species listed as Threatened or Endangered, under the Endangered Species Act;
- Any Candidate, or any species Proposed for listing, under the *Endangered Species Act*;
- Any species listed as G1 or G2 by a State Heritage Program;
- Any species listed as S1 or S2 by a State Heritage Program will not be collected in the state listing it as S1 or S2;
- Any species designated as a BLM State Director Sensitive Species that have been ranked G3 or S3 by a State Heritage Program and is included in the CPC network collection. (See ***Appendix 1***) BLM Field Office Botanists should carefully coordinate with the CPC Garden that collects in their region to make sure that G3 and S3 species are not overlooked in the collection by both groups, or are not inadvertently collected by both groups.
- Any species included in Appendix I of the *Convention in the Trade of Endangered Species* (CITES)
- Any non native invasive weed species
- Any agricultural or food crop species that may be growing on BLM lands
- Species in the genus *Quercus*, and other known recalcitrant seeds
- All species in the genus *Vitis*

5. REQUESTING SPECIES FOR COLLECTION

Seeds of Success is a large national project with partners from many different groups including the *BLM* with twenty or more collecting groups, *Lady Bird Johnson Wildflower Center*, *BMP Associates*, *Chicago Botanic Garden*, *Quarry Hill Arboretum* and the *San Diego Zoo*. Because RBG, Kew would like to minimize costs through duplication of species collections sent to the Millennium Seed Bank, **all collectors** including BLM groups and other RBG, Kew partners must send a **Request to Collect Species** to the Seeds of Success National Coordinator for tracking species assignments. In the first year of the program there were 23 different groups in the United

States collecting species for the Millennium Seed Bank.

The request to collect species is an excel spreadsheet. Columns **A** and **B** are used by the national coordinator to document when a species has been sent to RBG, Kew and to identify the collecting group assigned. Columns **C**, **D**, **E**, and **F** represent the taxonomic family, genus, specific epithet (species), and subspecies or variety respectively. Column **G** is the NRCS PLANTS database symbol, and column **H** is a common name for the plant. Columns **I**-**R** represent the restoration and conservation target categories as follows:

- **I** - native species needed for ecological restoration work
- **J** - native species of known forage or browse value
- **K** - species endemic to an ecoregion, but not considered rare in the ecoregion
- **L** - native wild relatives of cultivated or economically important species
- **M** - native species with significance to Tribes
- **N** - monotypic native species
- **O** - native species closely related to rare species not collected in this project
- **P** - native species closely related to non-native invasive weed species
- **Q** - native species important to pollinators, especially native bees and rare butterflies
- **R** - "flagship" or well-known and recognizable species such as state flowers and trees

Column **S** is required. This is the ecoregion column and represents ecoregions as defined by the Nature Conservancy. Since all species are listed by ecoregion first, species cannot be added to the database unless they are first associated with an ecoregion. We list each species in as many ecoregions as it has been identified in on the Seeds of Success website (http://www.nps.gov/plants/sos/species/index.htm) and we assign the collector to all occurrences of that species in the database.

The National Coordinator assigns species requests to collecting groups in the order in which the request to collect is received. If a collecting group does not collect all of the species assigned to them by the end of the collecting year or December 1, the collector should contact the coordinator to discuss if the species can be collected the following year or if they should be removed from the collector's list, where they could be assigned to another collector the following year.

6. PERMISSION TO COLLECT

Collecting seeds on public lands managed by the Bureau of Land Management is categorically excluded in NEPA. Department of the Interior (DOI) 516 Manual is the official guidance for determining the level of NEPA required. BLM's CX list is incorporated into the DOI NEPA manual at 516 DM 6, Appendix 5, Section 5.4 (effective 5/19/92). In the Forestry program section of the BLM Catagorical Exclusion list there are five categorical exclusions. The fifth one applies to seed collection as follows: *(5) Disposal of small amounts of miscellaneous vegetation products outside established harvest areas, such as Christmas trees, wildings, floral products (ferns, boughs, etc.), cones, **seeds**, and personal use firewood.*

BLM may give permission to other volunteer groups to collect for the *Seeds of Success* program on BLM managed lands, however, when these volunteers collect for BLM, a BLM employee

must sign the ***Notification of Transfer*** as part of the shipping documentation for all species collected under the cooperative agreement between BLM and Royal Botanic Gardens, Kew.

Collection may take place on private lands or lands managed by another federal agency or a state agency, with landowner permission. Document landowner permission on the field data form associated with the seed collection. We recommend keeping written documentation of permission to collect in your offices files when collections are made on lands other than those managed by BLM.

7. TARGETING THE POPULATION(S) FOR COLLECTION

It is essential that a competent botanist with knowledge of the target species is involved in identifying the most suitable population(s) for sampling. Choosing target populations will be up to the knowledgeable botanists and plant ecologists working at the field office level in BLM. An "ideal" collection will be from a large number of individuals (between 100 and 500) and will contain between 10,000 and 20,000 seeds. Collections this large maximize the use of the collection and provide that the collection can be split in two, and a duplicate can be held at a second Seed Bank. Maximizing the use of the collection means that:

- sufficient seed is available for germination and viability testing;
- samples are available for supply to users for restoration, education or scientific purposes;
- a substantial amount of seed can be conserved as a long term safeguard against loss of the wild population.

Where populations are suitable and the quality and quantity of seed is adequate, it may be possible to make collections of a number of different species from the same site. It is often helpful to make a preliminary visit to the site to assess the populations, to confirm the identification, to estimate the likely harvesting date and potential seed production.

The following points should be considered before harvesting takes place:

- Collectors should try to ensure that the population is of wild origin, not planted or cultivated. For example, do not collect seeds of native species that were included in a seed mix as part of post fire management in areas that were burned and seeded. Native species that were not seeded in those areas could be collected.
- Small populations (less than 50 individuals) or those that will yield less than 1,000 viable seeds in a collection following the sampling strategy above should not be collected. Seed development can vary within and between populations of the same species. Collectors should take time to monitor seed maturation and to assess insect damage and empty seeds throughout the population before making the seed collection.

8. SAMPLING STRATEGY

For many potential *users* and *uses* of the collection, it is important to maximize the number of alleles present within the sample, by capturing the greatest proportion of those alleles represented in the field population. According to Brown and Marshall (1995), at least one copy of 95% of the alleles occurring in the population at frequencies of greater than 0.05 can be achieved by sampling from:

1. 30 randomly chosen individuals in a fully outbreeding sexual species, or
2. 59 randomly chosen individuals in a self fertilizing species.

The reproductive biology of most target species has not been studied, and the capture of rarer alleles would require a markedly increased sample size, collectors are advised to sample from *in excess of 50 individuals, from within a single population*, where available and to look for populations with larger numbers of plants.

This analysis suggests that, with care, a single population seed sample collected in this way would possess the potential for re-establishment at that site, and perhaps for establishment at other sites within the natural range of the species. The probability of successful re-establishment at the original site can be increased by reflecting the *allelic frequencies* present in the population, however this would entail sampling from a much larger number of individuals than suggested above.

In order to increase the probability of conserving material that can be successfully established elsewhere within the natural range of the species, collectors would need to make additional population samples. BLM in the process of identifying species needed for restoration, and the number of collections needed for restoration or native plant materials development. These species will be collected throughout their range, but only the first sample collected will be included in the Millennium Seed Bank collection. Other BLM samples should be forwarded to the Bend Seed Extractory detailed in ***Section 18***.

9. IDENTIFICATION AND HERBARIUM SPECIMENS

It is critical to the value of the seed collections that the species is accurately identified. Voucher material is essential to enable the accurate identification of seed collections. Vegetative material and close-up photographs can occasionally be used, but the most useful voucher material for this project is a set of quality herbarium specimens (pressed, dried, plant specimens) for each collection. Therefore, collectors are required collect herbarium specimen voucher material for all *Seeds of Success* seed collections and to enter comprehensive identification notes on the field data form, with information about the presence of taxa closely related to the target species. It is not necessary to glue the voucher materials to a herbarium sheet or to make a herbarium label for the collection. Send the voucher material marked with the seed collection number to RBG, Kew. The Curation staff at Royal Botanic Gardens, Kew will mount the herbarium material and generate a label from the information on the field data form.

Herbarium specimens are valuable additional outputs from the collecting program in their own right, and collectors should take four representative herbarium specimens for each seed collection made. These specimens can be held at the most appropriate regional, national and international herbaria where they will be available for study or for classification by visiting taxonomists. Close-up photographs, especially of flowers or organs that may be damaged by pressing and drying, are welcome and should be sent to the co-ordinators with the collection number clearly written on the reverse or, in the event of digital files, cited in the file name.

Collectors wishing to learn the correct technique for herbarium specimen preparation should

either try to accompany an experienced botanist taking specimens in the field, or should try to attend a training session run as part of this project. Literature available to consult includes: Bridson and Forman (1992).

In the event that adequate material is not available to prepare herbarium specimens (e.g. no flowers, no foliage, and seeds which detach immediately from the parent), collectors need to propose one of the following options:

- Herbarium specimens that may have been taken from the exact same population earlier in the season (e.g. for the purposes of identification and population monitoring) may be used as vouchers for the seed collection. **The herbarium material must truly represent the individuals from which seed was collected**.
- Identification is carried out in the field by an acknowledged named expert familiar with the species.
- Representative individual(s) of the population are tagged and recorded with GPS so that herbarium specimens can be taken from these individuals in the following season when, for example, vegetative and fertile material would be available.
- RBG Kew may be able to prepare a cultivated voucher from some taxa, with the exception of large shrubs and trees.

When four herbarium specimens can be taken as a voucher for the seed collection, please follow one of the following two options:

Verification by a local taxonomist
If you have colleagues at local or regional herbaria that are willing to check your specimens, please indicate on the field data form that you intend to pass a set of herbarium duplicate specimens to a local taxonomist, (together with a copy of the field data form) for verification. Do not assume that all herbaria are resourced or willing to provide this service. However, if the specimens are of good quality, and it is explained that the transferred set of specimens can be incorporated into the herbarium, many taxonomists will be willing to help by confirming or updating the collector's identification. It is then the collector's responsibility to share the resulting data, i.e. collection number, genus, species, author, and any subspecies and variety names, together with the month verified, the name of the verifying taxonomist and herbarium, with the Seeds of Success project coordinators in ***Section 19***.

The remaining herbarium duplicates need to be incorporated into the Kew herbarium, Smithsonian Institution herbarium and other regional herbaria, as numbers of duplicates allow, with the verification details printed on a herbarium label ready for mounting. For most collecting teams, the easiest approach will be to send these remaining duplicate specimens to RBG Kew (to the same address as for the seed collections), where updated herbarium labels will be printed and subsequent distribution can be organized. If it is convenient, please include these specimens with the next scheduled shipment to RBG Kew, ideally in a separate cardboard package.

Verification by Kew taxonomists
If you do not have herbarium colleagues that can help with the verification of the herbarium specimens, please forward the complete set of duplicates to RBG, Kew (to the same address as for the seed collections). Kew will prepare herbarium labels with the collector's field identification and pass the duplicates to the Kew herbarium for verification. The determinations will be attached to the specimens, which will then be separated for the Kew herbarium, Smithsonian Institution herbarium, and regional herbaria, as numbers of duplicates allow and according to recommendations by the collecting teams. See ***Appendix 5*** for the herbaria that have been identified for distribution in your state to make sure that you collect the proper number of voucher specimens.

If you are making seed collections for restoration, you must also collect herbarium voucher material. You do not need to send the voucher material to Bend, but you should keep it at your Field Office Herbarium or another local herbarium so that all restoration materials can be source identified.

Nomenclature will follow Kartesz and Meacham (1999), *Synthesis of the North America Flora*. (http://www.bonap.org/synth.html) This is the standard taxonomy used in the USDA PLANTS Database and other national databases. BLM Field Offices collecting for Seeds of Success will be given a copy of a new BLM edition of the Synthesis of the North American Flora in FY2003. Only Kartesz names will be used on the species tracking lists and only Kartesz scientific names should be used on the field data forms. **Where subspecies and/or varieties are listed in Kartesz and Meacham, identification should be made to the subspecies and/or variety level.** One goal of the project is to identify the varieties of widespread species that are found in each ecoregion.

10. SEED COLLECTION TECHNIQUES

All seed collections should follow this protocol, including seeds that are used for restoration projects, and sent to the US Forest Service Region 6 Seed Extractory in Bend, OR and all seeds that are collected for germination and other testing and long term conservation storage at the Royal Botanic Gardens, Kew Millennium Seed Bank. Seed collection should follow the outline in the table below:

	Method	Rationale
1.	Assess the target population and confirm that a sufficient number of individual plants (usually 50) have seeds at natural dispersal stage.	To ensure that adequate genetic diversity can be sampled from the population, and that the seeds are likely to be at maximum possible viability and longevity.
2.	Carefully examine a small, representative sample of seeds using a cut test and for smaller seeds a hand lens.	Estimate the frequency of empty or damaged seeds and confirm that the majority of seeds are mature and fully formed.

	Method	Rationale
3.	Collect mature, dry seeds into either cloth or brown paper bags. Large collections can be made using plastic buckets and then transferred into bags.	Ensure the highest possible viability at collection and maximize the potential storage life at the Seed Bank.
4.	In general, cleaning should be left to the Seed Bank staff. If seeds can be liberated from their fruits quickly and easily, by shaking the open fruits over a container, carry this out and note it on the field data form.	Maximize the use of available field time and clean and prepare seeds in controlled laboratory conditions.
5.	Fleshy fruits should be collected directly into plastic bags and allowed to aerate. Specific advice on ripening and cleaning fleshy fruits is in Section 13, or contact RBG, Kew for assistance.	Fleshy fruits decompose rapidly and poor storage can lead to mold infested seed collections.
6.	Sample equally and randomly across the extent of the population, maintaining a record of the number of individuals sampled.	Capture the widest possible genetic diversity from the plant population sampled. Where the population exhibits a pattern of local variation, use a stratified random sampling method to ensure sampling from each microsite.
7.	Collect no more than 20% of the viable seed available on the day of collection.	Ensure that the sampled population is not over collected and is maintainable.
8.	Collect 10,000 to 20,000 viable seeds.	Enable maximum use and study of the collection.
9.	Collections between 5,000 and 10,000 viable seeds are welcome at RBG, Kew.	Less use will be made of these collections.
10.	Collections between 1,000 and 5,000 viable seeds are welcome, but distribution opportunities are limited.	These collections will be stored for long-term conservation, but will probably not be available for distribution.
11.	Collections of less than 1,000 seeds are welcome at RBG, Kew only when more productive populations are not available for sampling.	These samples will not receive any testing at RBG, Kew. These collections will most often come to RBG, Kew from countries other than the United States.
12.	If a population is very small, (less than 20 individuals) harvest and collect from each mother plant separately. Label each sample with a suffix e.g. a, b, c, to the collection number. These will not normally be collected in Seeds of Success.	Ensure that the full genetic diversity of particularly vulnerable plant populations can be successfully released at a later date. This is useful for plants that are widespread within an ecoregion or habitat, but never occur in large populations.

	Method	Rationale
13.	For each collection, estimate the viable seed production per fruit, per individual and per population, and note these on the field data form.	Document species seed biology, better assess the influence of collecting on the population, and gather information to better document if we are meeting *Standards for Rangeland Health* for native plant communities.
14.	Clearly label all bags (inside and out) with the appropriate collection number. No other data needs to be included on the label. Do **not** write on the cotton seed bags with permanent marker because it hinders their re-use in the seed collection program.	To ensure that this unique identifier is attached to each sample of a collection. All other data will be recorded on the field data form.

11. FIELD DOCUMENTATION

Use copies of the ***Field Data Form*** (***Appendix 2***) for all the seed collections. Fill out all the data fields, using the collection number format agreed with the project coordinators for your collecting team, office or organization. This is the unique reference that will be used to link the collection with all associated field data. The format should keep notation simple and each collection number should only be used once. Do not use the same numbers over in successive years of the project.

Photocopy the completed data forms and **send one copy to the project coordinator or email to plant@plantconservation.org** as soon as possible to document collection of the species. Hold one copy in the State and or Field Office where the collection took place, and send the original with the seeds to RBG, Kew or to a seed cleaning facility for the restoration seed collections. RBG, Kew will send the project coordinator data outputs spreadsheet format and these will be made available to appropriate state and field office botanists. Additional data on seed quality and seed collection size will be sent direct from Kew to collecting teams for an initial period to assist with development of collecting skills.

12. BLM SEED COLLECTION IDENTIFER FORMAT

All BLM offices, and groups collecting for BLM should use the following format to identify their collections. The identifer will include two parts: the Office mail stop number and collection such as **OR020-026** in Burns, Oregon for the 26th collection made by the Burns District Office, and **UT030-077** for the 77th seed collection made by the Grand Staircase Escalante National Monument. See ***Appendix 6*** for a list of all BLM Field Offices and mail stop codes.

13. CARE OF SEED COLLECTIONS AFTER HARVEST

In general, **keep the seed collections in a cool, dry place** prior to sending to the seed bank, but do not freeze them. Take care that seed collections do not overheat, for example by being left in a locked vehicle in full sun. Exposure to such sustained high temperatures can badly damage the seed collections. Try to maintain ventilation around the collections at all times and try to park the collecting vehicle in the shade, or at the very least, try to shade the windshield. Damp collections should, as soon as possible, be spread out on newspaper to dry naturally, either

outside in the shade or in a well-ventilated room, before dispatching material to RBG Kew.

In a few cases, where, for example, seeds have been collected fully mature within dry, bulky fruits or capsules, it may be relatively straight-forward and rapid to open the fruits carefully and to separate the seed by hand ready for shipping. In most cases, it is best to leave the task of cleaning the collections to RBG Kew processing staff who have a range of facilities to carry out this task once the collections arrive at Wakehurst Place.

Fleshy fruits may require careful handling, partial cleaning and rapid dispatch to the seed bank. There are two basic options:

a. Pack the whole fruits in strong plastic bags with as much air as possible. The bags should then be packed in some kind of rigid plastic container. This should ensure the fruits are not squashed and also do not get too hot and ferment too much during their journey. The seed bank staff at Kew are willing to receive and immediately clean fruits shipped in this way, but please give them advance notice using contact details below.
b. Remove as much flesh from the fruits as possible before transit. This can be done under cool running water using a sieve. The seeds should then be left to air dry *for a little while* before sending. They must not be dried on anything that will stick too much to the seeds, such as newspaper. They should then be packed as for dry seeds, i.e. in cloth bags.

If you have any specific queries such as, what *"a little while"* means for the species that you have collected, and to notify seed bank staff that fleshy fruits are in transit, please contact seed bank staff as follows:

Curation section, RBG Kew
Email**:** sos@kew.org
Tel: 011+44 1444-894128
Fax: 011+44 1444-894110

14. SHIPPING COLLECTIONS TO KEW

In general, **it is critical to the successful conservation of the seed that it is dispatched to the seed bank within a few days of collection**, together with the completed field data forms, using one of the air freight companies listed below. Voucher photos, and herbarium specimens may be sent for verification at a later date, and any other additional information may be sent to the project coordinators quoting the unique collection number given to the seed collection.

As often as possible place your entire seed collection in one bag. Keep a variety of sizes of bags on hand. Make sure that the seed bags are clearly labeled with the unique collection number. The preferred labels are those that can be neatly tied to the neck of the bag with string. This should allow for the bag to be opened and checked while in transit to the seed bank. As an additional precaution, place a second label on top of the seeds inside the bag. RBG, Kew prefers that we do **not** write on the cotton seed bags with permanent marker because it hinders their re-use in the seed collection program.

The labeled bags should be securely packaged for shipping to RBG Kew. The following packaging is recommended, either:

- sturdy cardboard box (secured with string to permit customs inspection and resealing) into which cotton seed bags have been placed
- a canvas or thick cotton sealable sack
- woven PVC or nylon air freight sack

Do not use the following for shipping seeds to the RBG, Kew:

- any non-breathable bags or containers
- any bags made from plastic or from PVC backed fabric (although you may be instructed to ship fleshy fruits in PVC bags as part of a shipment, see ***Section 13***).

15. SPECIES RESTRICTED FOR SHIPMENT TO THE UNITED KINGDOM

Plant Health restricted species listed below cannot be shipped to Kew, UK without a letter of authority to UK customs or a phytosanitary certificate issued by the USDA Animal and Plant Health Inspection Service (APHIS). A letter of authority to UK customs can be obtained by contacting Janet Terry at Kew (seedbank@kew.org) with details of the collections, ideally pre-collection so that there is ample time to send the paperwork to you.

We recommend that you get a plant health letter from RBG, Kew for this program rather than an APHIS phytosanitary certificate. There is no cost for a letter from Kew, but there is a $25.00 fee for a phytosanitary certificate and inspection is not routinely available in most towns where BLM offices are located. Remember, these are only required for shipments of seeds and fruits listed below. They are not required for any other species.

PLANT HEALTH

For sending **SEEDS** from the following plants from USA to Kew, you will first need a ***Letter of Authority*** issued by Janet Terry at Kew (seedbank@kew.org) *Allium ascalonicum*; *Allium cepa*; *Allium porrum*; *Allium schoenoprasum*; *Beta vulgaris*; *Capsicum*; *Helianthus annuus*; *Lycopersicon lycopersicum*; *Medicago sativa*; *Oryza*; *Phaseolus*; *Prunus*; *Rubus*; *Secale*; *Triticum*; *Zea mays*.

For sending **FRUITS** from the following plants from USA to Kew, you will first need a ***Letter of Authority*** issued by Janet Terry at Kew (seedbank@kew.org) *Annona*; *Cydonia*; *Citrus*; *Diospyros*; *Fortunella*; *Malus*; *Mangifera*; *Passiflora*; *Poncirus*; *Prunus*; *Psidium*; *Pyrus*; *Ribes*; *Syzygium*; *Vaccinum*.

As more becomes known about the potential hosts of *Phytophthera ramorum*, the APHIS-listed species in this section of the protocol are now to be treated as quarantine species for entry to UK and will need a ***Letter of Authority*** issued by Janet Terry at Kew (seedbank@kew.org).

Potato relatives (any member of the Solanaceae family) have also acquired quarntine status for import into the UK and will need a ***Letter of Authority*** issued by Janet Terry at Kew (seedbank@kew.org).

Please note: *Vitis* species (and also true seed of potato) are totally prohibited for import into the EU so on no account ship *Vitis* collections to the UK under this program.

US PHYTOSANITARY CERTIFICATES

US phytosanitary certificates are not requited for shipment of seeds to RBG, Kew when the species listed above have a letter of authority from Kew. If your collection has been positively identified and is not within the above listed genera, UK authorities will not require any additional paperwork. If your shipping company asks for a phytosanitary certificate, contact the program coordinator to try to resolve the problem.

Hosts of *Phytophthora ramorum*, known as sudden oak death may require a phytosanitary certificate **for re-entry of seeds into the US**. The known host plants of sudden oak death listed by APHIS (http://www.aphis.usda.gov/) where phytosanitary certificates may be required are:

Arrowwood (*Viburnum* x *odnantense*)
big leaf maple (*Acer macrophyllum*)
black oak (*Quercus kelloggii*)
California bay laurel (*Umbellularia californica*)
California buckeye (*Aesculus californica*)
California coffeeberry (*Rhamnus californica*)
California honeysuckle (*Lonicera hispidula*)
canyon live oak (*Quercus chrysolepsis*)
coast live oak (*Quercus agrifolia*)
huckleberry (*Vaccinium ovatum*)
madrone (*Arbutus menziesii*)
manzanita (*Arctostaphylos spp.*)
Rhododendron (*Rhododendron spp.*, including azalea)
shreve's oak (*Quercus parvula* var. *shrevei*)
tanoak (*Lithocarpus densiflorus*)
toyon (*Heteromeles arbutifolia*)
douglas-fir (*Pseudotsuga menziesii*)
California redwood (*Sequoia sempervirens*)
cascara (*Rhamnus purshiana*)
salmon berry (*Rubus spectabilis*)
western poison oak (*Rhus diversiloba*)
western star flower (*Trientalis latifolia*)
victorian box (*Pittosporum undulatum*)

Contact seedbank@kew.org for more instruction before sending any of these species to RBG Kew.

16. CITES SPECIES

Over 600 species of US plants are controlled by the Convention on International Trade in Endangered Species (CITES) (http://www.cites.org/). All **cacti** and **orchids**, for example, are included in either CITES Appendix II or Appendix III. Appendix I includes species presently threatened with extinction that are or may be affected by export or trade. CITES directs its most stringent controls at activities involving these species. **Appendix I species are not part of the *Seeds of Success* program and should not be collected.**

Appendix II species are not presently threatened with extinction but may become so if not regulated. CITES does not require import permits, but each shipment must be accompanied by a permit issued by the exporting country's Management Authority. For us, this is the US Fish and Wildlife Service (http://www.fws.gov/) Export permits may be issued for any purpose as long as the export will not be detrimental to the species' survival and the specimens were legally acquired. Export permits are valid for 6 months.

Appendix III includes species listed by a country to obtain international cooperation in controlling trade. An export permit is needed to ship specimens placed on this list by the US.

16a. SENDING SEEDS OF CITES APPENDIX II or III SPECIES to RBG, KEW
Seeds of Appendix II or Appendix III species are exempt from CITES and no extra paperwork or permits are required for BLM to ship seeds of these species to the Millennium Seed Bank, or for RBG, Kew to send BLM's half of every seed sample back to the US.

16b. SENDING HERBARIUM MATERIAL OF CITES APPENDIX II or III SPECIES to RBG, KEW
Live plants and herbarium voucher materials are controlled by CITES and permits are required. Please take great care not to inadvertently send CITES material to the UK without the necessary permits.

IF BLM is cooperating with a CITES registered institution such as one of the member botanic gardens of the Center for Plant Conservation, CITES listed material can be exchanged between CITES-registered institutions using printed reference labels. RBG, Kew is a CITES registered institution. Check with each partner on the status of their CITES registration before asking them to collect species listed on Appendix II or Appendix III.

In all other cases, CITES permits would need to be obtained from the exporting authority for the United States and the UK importing authority. More instructions will be made available as we work this process out for the Seeds of Success program with the US Fish and Wildlife Service.

In the 2003 collecting year, you can collect seeds of CITES Appendix II and III species. And you can send those seeds to RBG, Kew. Collect herbarium vouchers of these species, but **do not** send them to Kew until CITES permits are received or until further instructions are given.

17. ARRANGING AIR FREIGHT
RBG, Kew has accounts with the following freight agents for the sole purpose of express shipping seed collections and appropriate field data to Kew for processing. Please always send the data forms along with the seed collections as this helps to accession the collections correctly. Herbarium specimens may be sent either by express freight or by standard airmail.

DHL is the project's preferred freight agent, and full DHL shipping instructions follow below. If DHL will come to your office location and pick up, then BLM is required to use DHL. If DHL will not pick up shipments from your location, please contact the National Coordinator to get help resolving the problem.

17a. SHIPMENT WITH DHL
To arrange a pick-up, to get information about the nearest DHL office or to track a shipment already made, call 1800-CALL DHL or (480) 303 5797 or visit http://www.dhl-usa.com/

Please try to avoid mailing seed shipments at the end of the week, when there is a greater chance of shipments being held in storage until the next possible delivery to the Seed Bank on the following Monday. You will require the following documents with the shipment:

Document	Number required	Notes
DHL Shipment Airwaybill	One original	See ***Section 17*** below
Shipping Invoice and Notification of Transfer	Five signed originals	See ***Section 17*** below and use form in ***Appendix 3***
Letter of Authority (if plant listed in ***Section 15***)	One original	Obtained from RBG Kew
CITES import/export permits if CITES material is to be shipped (see ***Section 16***)	One original	Contact national coordinator before sending herbarium voucher material
Note to inform seed bank staff of any irritant, toxic or hazardous material	One original	

COMPLETING A DHL SHIPMENT AIRWAY BILL

Pre-addressed DHL airwaybills are available from the project coordinators. DHL will supply blank airwaybills for completion by hand if necessary, the following details should be entered.

1. From (Sender)
   - Account Number (**961517856**)
   - Sender Name (**enter your name**)
   - Company Name and Address (**enter your organization name and address**)

2. To (Receiver)
   - Company Name (**Millennium Seed Bank**)
   - Delivery Address (**Royal Botanic Gardens, Kew; Wakehurst Place: Ardingly Near Haywards Heath: West Sussex; Postcode RH17 6TN, United Kingdom**)
   - Contact Person (**Keith Manger**)
   - Contact Phone Number (**01444-894-151**)

3. Shipment Details
   - **Worldwide Parcel Express; Transport Collect, NO Shipment Insurance**;
   - Description of Contents (**non commercial wild plant seeds and herbarium specimens collected from the USA for scientific purposes, plus associated documents**)
   - Declared Value for Customs (**$1** per collection or other reasonable figure, as entered on the invoice)
   - **Permanent Export: Receiver pays all duties/taxes**

COMPLETING A SHIPMENT INVOICE AND NOTIFICATION OF TRANSFER
Please use the form prepared for the project in ***Appendix 3***, noting the following points:

- invoices must be originals
- invoices must be completed on the letterhead of your organization, if available
- invoices should be typewritten, if possible
- invoices must not have any handwritten or obvious typewritten corrections
- details on the invoice must match those given on the airway bill
- five original signed invoices are required

17b. SHIPMENT WITH FEDEX
Use of the Royal Botanic Gardens, Kew account for shipping with FedEx is limited for use by only those BLM offices where DHL will not make a pick up. IF you cannot ship with DHL, please contact the program coordinator, to attempt to resolve the problem and get shipments set up. The program coordinator will need the name of the city where DHL is located that would need to come to your office, and the name of the person in DHL who you talked to when trying to set up a pickup at your office. If the national coordinator cannot reach agreement with DHL for timely pickup, then permission will be given to use the Royal Botanic Gardens, Kew shipping account with FedEx.

Be careful not to use the regular BLM FedEx account number on any FedEx airway bills or the combined FedEx Invoice and Notification of Transfer document when sending collections to Kew. BLM Field Offices do not typically budget money for international courier service, and someone will notice if the cost of using Fed Ex skyrockets in your office. The sub activities you work in could be taxed to pay the substantial shipping charges. Since RBG, Kew is willing to pay for courier service for all shipments of seed and plant material to the Millennium Seed Bank, please make sure that the account number you use is the proper one. Also, shipping costs are a part of the in-kind match that Kew gives to BLM for any challenge cost share type of project involving the Seeds of Success Program.

Please try to avoid mailing seed shipments at the end of the week, when there is a greater chance of shipments being held in storage until the next possible delivery to the Seed Bank on the following Monday. The following documents are required for shipment with FedEx:

Document	Number required	Notes
FedEx Shipment Airwaybill	One original	
Shipping Invoice and Notification of Transfer	Five signed originals	See ***Section 17*** above and use form in ***Appendix 3***
Letter to courier service	One signed original	See ***Appendix 4***
Letter of Authority (if plant listed in ***Section 15***)	One original	Obtained from RBG Kew
CITES import/export permits if CITES material is to be shipped (see ***Section 16***)	One original	Contact RBG Kew
Note to inform seed bank staff of any irritant, toxic or hazardous material	One original	

Shipping with FedEx is new to the Seeds of Success program in 2003. Initially, we are trying to work with FedEx to make the paperwork match the paperwork required by DHL. We will make changes to this protocol as necessary, as the summer progresses and more seeds are shipped with this courier.

COMPLETING A FEDEX SHIPMENT AIRWAY BILL

FedEx will supply blank airwaybills for completion by hand if necessary, the following details should be entered.

1. From (Sender)
   - Account Number (**call the project coordinator for the account number**)
   - Sender Name (**enter your name**)
   - Company Name and Address (**enter your organization name and address**)

2. To (Receiver)
   - Company Name (**Millennium Seed Bank**)
   - Delivery Address (**Royal Botanic Gardens, Kew; Wakehurst Place: Ardingly Near Haywards Heath: West Sussex; Postcode RH17 6TN, United Kingdom**)
   - Contact Person (**Keith Manger**)
   - Contact Phone Number (**01444-894-151**)

3. Shipment Details
   - **Worldwide Parcel Express; Transport Collect, NO Shipment Insurance**;
   - Description of Contents (**non commercial wild plant seeds and herbarium specimens collected from the USA for scientific purposes, plus associated documents**)
   - Declared Value for Customs (**$1** per collection or other reasonable figure, as entered on the invoice)
   - **Permanent Export: Receiver pays all duties/taxes**

COMPLETING A SHIPMENT INVOICE AND NOTIFICATION OF TRANSFER

Please use the form prepared for the project in ***Appendix 3***, noting the following points:

- invoices must be originals
- invoices must be completed on the letterhead of your organization, if available
- invoices should be typewritten, if possible
- invoices must not have any handwritten or obvious typewritten corrections
- details on the invoice must match those given on the airway bill
- five original signed invoices are required

18. SHIPPING SEEDS TO THE BEND, OREGON FOREST SERVICE SEED EXTRACTORY

Since only one sample of each species may be sent to RBG, Kew for cleaning and testing, duplicates species collected for restoration projects or native materials development by BLM employees or contractors and partners can be sent to the following address:

USDA
USFS - Bend Seed Extractory
63095 Deschutes Market Road
Bend, OR 97701
(541) 383-5646
(541) 383-5498 Fax

Notify the Seed Extractory that seeds will be shipped and **always send the seeds overnight mail or with *FedEx***. Include a copy of **the completed field data sheet** documenting the collection with all shipments of seed to the Bend Seed Extractory. Include instructions on where you would like the seed to be returned when it is clean and what (if any) basic tests you would like completed on the seeds. Pack the seed in the same manner you would for sending the RBG, Kew. Send BLM Offices are responsible for all shipping costs for seed sent to the Bend Seed Extractory.

19. PROGRAM CONTACTS

Below are program contacts in the Washington office and in the UK at the Millennium Seed Bank. Not all BLM offices have the capacity for international phone calls or faxing. Email is available internationally.

SOS Coordinator

Carol Spurrier
(For overnight mail or UPS)
Bureau of Land Management
Forest, Fish and Wildlife Group
1620 L Street NW Room 204
Washington, DC 20036
Tel: 202-452-7736
Fax: 202-452-7702
Email: carol_spurrier@blm.gov

(*For US Postal Service mail)*
Bureau of Land Management
Forest, Fish and Wildlife Group
1849 C Street NW (LSB-204)
Washington, DC 20240

Olivia Kwong
Plant Conservation Alliance/SER
1849 C Street NW (LSB-204)
Washington, DC 20240
Tel: 202-452-0392
Fax: 202-452-7702
Email: plant@plantconservation.org
or olivia_kwong@blm.gov

Coordinator for the Americas at RBG, Kew
Michael Way, BSc. MIEEM
Seed Conservation Department
Royal Botanic Gardens, Kew
Wakehurst Place, Ardingly, Haywards Heath
West Sussex, RH17 6TN, UK
Tel: 011+44 1444-894106
Fax: 011+44 1444-894110
Email: m.way@rbgkew.org.uk
http://www.rbgkew.org.uk/seedbank/msb.html

Processing team leader (USA)
Nicola Cotton
Seed Conservation Department
Royal Botanic Gardens, Kew
Wakehurst Place, Ardingly, Haywards Heath
West Sussex, RH17 6TN, UK
Tel: 011+44 1444-894128
Fax: 011+44 1444-894110
Email: n.cotton@rbgkew.org.uk
http://www.rbgkew.org.uk/seedbank/msb.html

Questions or information about individual collections of seed, herbarium material or data:
sos@kew.org

Requests for plant health letter of authority for United Kingdom customs
Seedbank@kew.org

Seeds of Success project coordinators group address:
SOS-coordinators@kew.org (address pending)

2001-2002 BLM State *Seeds of Success* program Contacts and Student Conservation Association\Team Contacts

State	Name	Email	Phone
AK 040	Debbie Blank	debbie_blank@ak.blm.gov	907-267-1227
AZ 930	John Anderson	john_anderson@blm.gov	623-580-5520
CA 930	John Willoughby	john_willoughby@ca.blm.gov	916-978-4638
CA 320 (SCA)	Michael Dolan	michael_dolan@ca.blm.gov	530-233-7903 (Alturas)
CA 170 (SCA)	Anne Halford Karen Ingram-Ferrell	anne_halford@ca.blm.gov ingram@telis.org	760-872-5022 (Bishop)
CA 330	Jennifer Wheeler Clara Sander	jennifer_wheeler@ca.blm.gov clara_sander@ca.blm.gov	707-825-2316 707-825-2348
CO 932 CO 932 (SCA)	Carol Dawson Pam Cornelisse	carol_dawson@co.blm.gov pam_cornelisse@blm.gov	303-239-3725 303-239-3764 (Denver)
ES 930	Geoff Walsh	geoffrey_walsh@es.blm.gov	703-440-1551
ID 930	Roger Rosentreter	roger_rosentreter@blm.gov	208-373-3824
MT 930	Bill Volk	william_volk@blm.gov	406-896-5029

NM 930	Cheryl Dyer	cheryl_dyer@nm.blm.gov	505-761-8719
NV 930	Ted Angle	ted_angle@nv.blm.gov	775-861-6401
NV 052 (SCA)	Gayle Marrs-Smith Christina Nelson	gayle_marrs-smith@nv.blm.gov christina_nelson@nv.blm.gov	702-647-5156 702-515-5198 (Las Vegas)
OR 930	Joan Seevers	joan_seevers@or.blm.gov	503-808-6048 (Portland) 541-858-2276 (Medford)
OR 050 (SCA)	Nelson Salisbury Ron Halvorson	nelson_w_salisbury@or.blm.gov ron_halvorson@or.blm.gov	541-416-6700 (Prineville) 541-416-6736 (Prineville)
UT 930	Ron Bolander	ron_bolander@blm.gov	801-539-4065
UT 030 (SCA)	Walt Fertig Laura Fertig Holly Beck	walt_fertig@blm.gov laura_fertig@blm.gov holly_beck@blm.gov	435-644- 4339 (Kanab) 435-644-4337 435-644-4300
WY 930	Don Simpson	don_simpson@blm.gov	307-775-6113

Other US Seeds of Success Collection Contacts

Organization	Contact Name	Phone
Lady Bird Johnson Wildflower Center	Flo Oxley	512-292-4200
BMP Associates	Bruce Pavlik Alison Stanton	510-430-2158 415-379-9086
California Native Plant Society	Julie Evens Allison Schilling	916-327-0714 909-789-1304
Chicago Botanic Garden		
San Diego Zoo	Joey Beltzer	
Quarry Hill Arboretum		
Virginia Native Plant Society		

Seed Extractory Contacts

Organization	Contact Name	Phone
USDA FS Region 6 Seed Extractory	Jim Barner Nita Rausch	451-383-5481

APPENDIX 1. SPECIES INCLUDED IN THE CPC NETWORK COLLECTION

List is available at http://ridgwaydb.mobot.org/cpcweb/CPC_NCList_Quick.asp

APPENDIX 2. BLM SEEDS OF SUCCESS FIELD DATA FORM (Revised 25 June 2003)

Please use BLOCK CAPITALS
Please complete all the priority fields labeled in **bold**
Please circle relevant descriptions shown in *italics*.

MSB Serial Number:
NRCS PLANTS Code:

Date Collected (DD/MM/YY): **Seed Collection Reference Number:**

Collector(s):

Country: USA **Ecoregion:** **State:** County:

Location Details:

Lat. (dg/min/sec): N GPS Used?: *Yes No* If no, please see other side.

Long. (dg/min/sec): W GPS Datum: *NAD83 NAD27 WGS84 Other:*

Elevation (feet): Landowner Details (Permission?):

HABITAT DATA

Habitat & Associated Species:

Modifying Factors: *Mowed Burned Grazed Flooded Seeded Trampled Other:*

Land Form: Slope°:

Land Use: Aspect: *N NE E SE S SW W NW*

Geology:

Soil Texture: *Clay Silt Sand Other:* Soil Color:

COLLECTION DATA - If plant has been identified by a specialist, please see other side.

Family: **No. of Plants Sampled:**

Genus: **No. of Plants Found (approx.):**

Species: **Area Sampled (acres):**

Subspecies/Variety:

Seeds Collected From: *Plants Ground Both*

Plant Habit: *Tree Shrub Forb Succulent Grass/Grasslike* Plant Height (feet):

Does the pressed specimen have the same reference as the seed collection?: *Yes No*

If not, enter details of collector, reference, where lodged, and date collected:

Notes to assist identification of pressed specimen (e.g. flower color, odor, presence of closely related species):

Common Name(s) of Plants:

Photograph Taken: *Digital 35mm* Reference: Where Image will be Filed:

PRE-COLLECTION CHECKLIST

(Check box to right if condition indicated by **boldface** *is met or is the most frequently occurring condition.)*

Assess Population & Seed Dispersal Stage	
Approximate area of population: x (feet, yards, miles……)	
Approximate total number of individual plants present and accessible: *0-50* *50-500* *500-5000* *> 5000*	
Evidence of disturbance or damage: *Resown* *Burnt* *Sprayed* ***No damage***	
Readiness of population for collecting: give percentages or circle the most frequently occurring: *Vegetative* *In flower* *Immature seeds* ***Around natural dispersal*** *Post dispersal*	
Estimate the number of individual plants at natural dispersal stage: *<50* ***>50***	
Is the population: ***A single population*** *A population with distinct sub-populations* (Can you sample separately or from the most suitable?)	

Assess Seed Quality & Availability	
On a typical individual, where on the plant/branch/fruit is the seed at natural dispersal stage: **Recognized**	
Using a cut test on the seeds at this stage, give percentages or circle the most frequently occurring: ***Healthy*** *Insect-damaged* *Empty* *Moldy* *Malformed/other damage*	
Estimate the number of healthy seeds per fruit:	
Estimate the number of fruits per individual plant:	

Should Seed Be Collected On This Trip?	
Using the above information, if you only collect 20% of the healthy seeds available today, will this result in a collection of **>10,000** healthy seeds?	

OTHER DATA

If GPS was not used, please state method of obtaining lat. and long.: *Altimeter* *Map*

Map Publisher:

Series: Scale:

Map Coordinates: Map Date (DD/MM/YY):

Herbarium voucher specimens:

Number of Pressed Specimens: *2* *3* *4* *or more*

Circle one:

a. *All Herbarium duplicates will be sent to Kew to arrange labeling, verification and distribution (default)*

b. *One duplicate will be sent to _____ herbarium for verification, other duplicates will be sent by the collector to Kew to arrange labeling and distribution.*

c. *All Herbarium duplicates will be sent to _____ herbarium that has agreed to arrange labeling, verification and distribution.*

By default, besides any herbaria mentioned above, one specimen will be sent to Kew and one to the Smithsonian. If you would like to request that additional specimens be sent to regional and/or local herbaria, please fill in the following information:

Regional Herbarium: Local Herbarium:

If collection has been identified by a specialist, please complete sections below:

Material Identified: *In Field* *From Pressed Specimen on Day of Collection* *From Pressed Specimen on Another Date* *From Photograph*

Date identified (DD/MM/YY):

Identified by: Organization:

APPENDIX 3.

NOTIFICATION OF TRANSFER and DHL SHIPMENT INVOICE

THE FOLLOWING ITEMIZED LIST OF MATERIAL IS TRANSFERRED BETWEEN BLM AND RBG, KEW IN ACCORDANCE WITH TERMS AND CONDITIONS OF THE ACCESS AND BENEFIT SHARING AGREEMENT DATED MAY 9TH 2000.

SIGNED BY: **DATE:**

Title: **Name:**

For and on behalf of the United States Department of the Interior Bureau of Land Management

Date of invoice _____ Airwaybill number:_____

Invoice Number _____ Carrier: DHL Worldwide Express

Number of pieces_____ Total weight_____

Dimensions ____x____x_____cms Account number: 961517856

Sender:	**Receiver:**
Name:	Name: Millennium Seed Bank
Address:	Address: Royal Botanic Gardens, Kew Wakehurst Place, Ardingly, West Sussex
Zip Code:	Postcode: RH17 6TN
Country: USA	Country: United Kingdom
Contact name	Contact name Keith Manger
Tel: Fax:	Tel 01444-894151 Fax 01444-894110

Customs Code number	**Reason for export**: scientific study, processing and conservation at Royal Botanic Gardens, Kew	**Terms of delivery** WPX United Kingdom	**Full description of Goods** Non-commercial wild plant seeds collected from USA for scientific purposes; dried pressed plant specimens; associated documents and data forms	**Type of export**: Permanent and temporary (Half of the processed seeds will be returned to US by agreement)	Collected on land managed by Bureau of Land Management? Indicate Yes or No
Date Collected	**Seed Collection Reference Number**	**Plant Family**	**Name of Plant Species**	**Number of herbarium Duplicates**	

DECLARATION: I declare that the above information is true and correct to the best of my knowledge, and that the goods are of USA origin. **Total value for Customs $USD** 10

SIGNED BY: NAME:

Job title Date:

Organization:

SIGNED ON RECEIPT BY: NAME:

Title: DATE:

For and on behalf of the Board of Trustees of the Royal Botanic Gardens, Kew, United Kingdom

APPENDIX 4. LETTER TO COURIER SERVICE

Date

Bureau of Land Management
Office address

Dear Courier:

Please be advised that this shipment complies with all Plant Health and Convention in the Trade of Endangered Species (CITES) regulations. One of the two following statements regarding plant health regulations is checked and applies to this shipment:

- ❑ This package does not need a phytosanitary certificate. It does not contain any material restricted for import into the European Union (EU) under plant health regulations.

- ❑ A *Letter of Authority* issued by the Plant Health Officer, Royal Botanic Gardens, Kew accompanies all *Seeds of Success* shipments that contain restricted plant material. The Letter of Authority allows import of such species into the licensed quarantine facilities on their premises at Wakehurst Place, Sussex, United Kingdom (UK), and replaces the phytosanitary certificate issued by the Animal and Plant Health Inspection Service (APHIS). This shipment contains _____ which require(s) *a Letter of Authority* for import into the UK.

The Bureau of Land Management does not include any listed (under provisions of the Endangered Species Act) threatened or endangered plant species or plants on Appendix I of CITES in the *Seeds of Success* Program. Appendix I species are not included in this shipment. One or more of the following checked statements covers the status of CITES permits or licenses.

- ❑ This shipment does not contain any species listed on CITES Appendix II or III. This shipment contains seeds and/or dried plant specimens that are not controlled by CITES. No permits or licenses are required.

- ❑ This shipment contains **seeds** of _____, which is/are included on Appendix II or III of CITES. Seeds of plants from the United States listed as Appendix II or III species are exempt from CITES regulations and do not require import licenses or export permits.

- ❑ This shipment contains **plant material** of _____, which is/are included on Appendix II or III of CITES. An export permit issued by the *US Fish and Wildlife Service*, the US CITES authority and an import license issued by UK authorities are included.

Please be advised that, as the shippers of plant material from public lands in the US, there is close co-ordination between the botany program personnel of the Bureau of Land Management, and the Royal Botanical Gardens, Kew. This close coordination ensures that all shipments are in accordance with all Plant Health and CITES regulations.

Sincerely,

NAME

POSITION

APPENDIX 5. OFFICES AND HERBARIA

State/ Office	Statewide or Regional Herbaria	Contact Name and phone number at that herbarium	Local Herbaria chosen	Contact Name and Phone number at local herbaria
AK930	University of Alaska - Anchorage Herbarium 3311 Providence Dr. Anchorage, AK 99508	Marilyn Barker 907-786-1324	BLM, ASO 930, Lands and Renewable Resources Anchorage, AK 99513	John Payne 907-271-3431
AK040	University of Alaska Museum Herbarium PO Box 756960 907 Yukon Dr. Fairbanks, AK 99775-6960	Carolyn Parker 907-474-7109	BLM, Anchorage Field Office 6881 Abbott Loop Rd. Anchorage, AK 99507	Deborah Blank 907-267-1227
AK025	University of Alaska Museum Herbarium PO Box 756960 907 Yukon Dr. Fairbanks, AK 99775-6960	Carolyn Parker 907-474-7109	BLM, NFO Kotzebue Field Station Kotzebue, Alaska	Randy Meyers 907-442-3430
AZ930	Arizona State University Herbarium Dept. of Plant Biology PO Box 87101 Tempe, AZ 85287-1601	Dr. Les Landrum	Phoenix Field Office 21605 N. Seventh Ave. Phoenix, AZ 85027	John L. Anderson 623-580-5520
All AZ Field Offices	Arizona State University Herbarium Dept. of Plant Biology PO Box 87101 Tempe, AZ 85287-1601	Dr. Les Landrum		
AZ010			Arizona Strip Field Office 345 E. Riverside Dr. St. George, UT 84790-9000	Lee Hughes 435-688-3229
AZ100			Arizona Strip Field Office 345 E. Riverside Dr. St. George, UT 84790-9000	Kari Yanskey 435-688-3379
CA160	UC Jepson	Bruce Baldwin 510-643-7008	Bakersfield FO	FO Botanist(Vacant) 661-391-6000
CA169	UC Jepson	Bruce Baldwin 510-643-7008	Goodwin Education Center	Kathy Sharum 661-391-6033
CA170	Rancho Santa Ana Botanic Garden	Steve Boyd 909-625-8767	BLM Bishop Field Office 785 N. Main, Suite E Bishop, CA 93514	Anne Halford 760-872-5022
CA180	UC/Jepson Herbarium	Bruce Baldwin 510-643-7008	University of California Davis	Ellen Dean 530-752-1091
CA190	UC/Jepson Herbarium	Bruce Baldwin 510-643-7008		
CA320	UC/Jepson Herbarium	Bruce Baldwin 510-643-7008		
CA330	CSU Humboldt Herbarium	Robin Bency 707-826-4801	Arcata Field Office Herbarium	Jennifer Wheeler 707-825-2316

State/ Office	Statewide or Regional Herbaria	Contact Name and phone number at that herbarium	Local Herbaria chosen	Contact Name and Phone number at local herbaria
CA340	UC/Jepson Herbarium	Bruce Baldwin 510-643-7008	University of California Davis	Ellen Dean 530-752-1091
CA350	UC/Jepson Herbarium	Bruce Baldwin 510-643-7008	Eagle Lake Field Office Herbarium 2950 Riverside Dr. Susanville, CA	Beth Corbin 530-252-5305
CA360	CSU Chico Herbarium Chico, CA 95929	Lawrence Janeway (530) 898-5381	Redding Field Office Herbarium 355 Hemsted Dr. Redding, CA 96002	Joe Molter 530-224-2130
CA370	UC/Jepson Herbarium	Bruce Baldwin 510-643-7008		
CA650	Rancho Santa Ana Botanic Garden	Steve Boyd 909-625-8767		
All CO offices	University of CO Museum Herbarium Clare Small Building Campus Box 350 Boulder, CO 80309-0350	Tom Ranker 303-492-5074 ranker@stripe.colorado.edu		
All CO offices	CSU Herbarium Dept. of Biology Colorado State University Fort Collins, CO 80523-1878	Dr. Mark Simmons 970-491-0496 psimmons@lamar.colostate.edu		
All CO offices	University of Wyoming Rocky Mountain Herbarium Dept. of Botany PO Box 3165 Laramie, WY 82071-3165	Ron Hartman 307-766-2236		
All CO offices			Colorado College, 14 E. Cache la Poudre Colorado Springs, CO 80903	Dr. Tass Kelso 719-389-6405
All CO offices			Adams State College 208 Edgemont Blvd. Alamosa, CO 81102	Catherine Kleier 719-587-7767 cckleier@adams.edu
All CO offices			Univ. of CO - Denver Dept. of Biology Campus Box 171 PO Box 173364 Denver, CO 80217-3364	Leo Bruederle 303-556-3419
ES	No response to memo			
ID070	Museum of Natural History Ray D. Davis Herbarium Idaho State University Campus Box 8096 Pocatello, ID 83209	Karl Holte 208-282-3530		
ID080	Dept. of Biological Sciences Stillinger Herbarium Univ. of Idaho Moscow, ID 83844	Pam Brunsfield 208-885-4623		

State/ Office	Statewide or Regional Herbaria	Contact Name and phone number at that herbarium	Local Herbaria chosen	Contact Name and Phone number at local herbaria
ID090	Boise State University Herbarium Dept. of Biology 1910 University Dr. Boise, ID 83725	Dr. Jim Smith 208-426-3551	Lower Snake River District.Herbarium 3948 Development Dr. Boise, ID 83705	Ann DeBolt 208-384-3465
MT030	North Dakota State University Herbarium Hastings Hall Fargo, ND 58105	Dr. Lee Manske 701-483-2076	Dickinson Research Ext. Center 1089 State Ave. Dickinson, ND 58601	Dr. William Barker 701-231-7222
MT923	408 Lewis Hall Dept. of Plant Sciences Montana State University Bozeman, MT 59717	Curator: Matt Lavin, mlavin@montana.edu, 406-994-2032 (office), 406-994-1848 (fax). Collections manager: Cathy Seibert, 406-994-4424 (herbarium) Curator Emeritus: John Rumely		
MT923	University of Montana 32 Campus Dr. Missoula, MT 59812	Curator David Dyer 406-243-4743		
MT923	Charles A. Taylor Herbarium Agricultural Hall 320 Dept. of Biology & Microbiology SD State University Brookings, SD 57007	Gary E. Larson, Ph.D., Curator 605-688-4552; 605-688-6677 (fax)		
NV052	Nevada State Museum 600 N. Carson St. Carson City, NV 89701	George Baumgardner 775-687-4810	Herbarium Dept. of Bio. Sci. Univ. of NV - Las Vegas 4505 Maryland Pkwy Box 454004 Las Vegas, NV 89154-4004	Dr. Wes Niles 702-895-3098
NV052			Bureau of Land Management Las Vegas Field Office 4701 N. Torrey Pines Dr. Las Vegas, NV 89130	Gayle Marrs-Smith 702-515-5156
NV030	University of Nevada, Reno Herbarium	Christy Malone 775-784-1105		
NM	No response to memo			

State/ Office	Statewide or Regional Herbaria	Contact Name and phone number at that herbarium	Local Herbaria chosen	Contact Name and Phone number at local herbaria
OR010 OR014 OR020 OR030 OR050 OR080 OR090 OR100 OR110 OR120 OR134	OSU Herbarium Dept. of Botany and Plant Pathology 2082 Cordley Hall Corvallis, OR 97331-2902	Aaron Liston-Director Richard Halse-Curator 541-737-4106		
OR030			Albertson College of Idaho 2112 Cleveland Blvd Caldwell, ID 83605	Dr. Don Mansfield 208-459-5287
OR020			BLM Burns District Herbarium 28910 Hwy 20 West Hines, OR 97738	Nora Taylor 541-573-4471
OR110			Medford BLM Herbaria	Mabel Jones 541-618-2269
OR130	University of Washington	Dick Olmstead 206-543-1682	Spokane District Herbarium Wenatchee, WA	Pamela Camp 509-665-2100
UT930	Stanley L Welsh Herbarium Brigham Young Univ. 378-MLBM Provo, UT 84602	Duane Atwood 801-378-4955	Bureau of Land Management Utah State Office P.O. Box 45155 Salt Lake City, UT 84145-0155	Ronald Bolander 801-539-4065
UT030			Grand Staircase-Escalante National Monument 190 E. Center St. Kanab, UT 84741	Walter Fertig 435-644-4363
UT050	Stanley L. Welsh Herbarium Brigham Young Univ. 378 MLBM, BYU Provo, UT 84602	Duane Atwood 801-378-4955	Utah Valley State College - Herbarium Dept. of Biology Life Sciences 800 W. 1200 S. Orem, UT 84058-5999	Renee VanBuren 801-222-8479 801-222-8695
UT080	Intermountain Herbarium Utah State University 5305 Old Main Hill Logan, UT 84322	Dr. Mary Barkworth 435-797-1584	Uinta Basin Herbarium Bureau of Land Management 170 S. 500 East Vernal, UT 84078	Robert Specht 435-781-4436
UT080	Rocky Mt. Herbarium University of Wyoming 3165 University Sta. Laramie, WY 82071	Dr. Ron Hartman 307-766-2236		
WY930	Western Wyoming College			
WY930	Rocky Mt. Herbarium University of Wyoming			

APPENDIX 6. BLM FIELD OFFICES AND MAIL STOP CODES

AK020 - Northern Field Office
AK040 - Anchorage Field Office
AK050 - Glenallen District Office
AK930 - Alaska State Office
AZ030 - Kingman Field Office
AZ010 - Arizona Strip Field Office
AZ020 - Phoenix Field Office
AZ040 - Safford Field Office
AZ050 - Yuma Field Office
AZ060 - Tucson Field Office
AZ061 - San Pedro Project Office
AZ070 - Lake Havasu Field Office
AZ930 - Arizona State Office
CA067 - El Centro Field Office
CA068 - Barstow Field Office
CA160 - Bakersfield Field Office
CA170 - Bishop Field Office
CA180 - Folsom Field Office
CA190 - Hollister Field Office
CA320 - Alturas Field Office
CA330 - Arcata Field Office
CA340 - Ukiah Field Office
CA350 - Eagle Lake Field Office
CA360 - Redding Field Office
CA370 - Surprise Field Office
CA610 - California Desert District
CA650 - Ridgecrest Field Office
CA660 - Palm Springs-South Coast Field Office
CA690 - Needles Field Office
CA930 - California State Office
CO??? - Arkansas Headwaters Recreation Area
CO100 - Little Snake Field Office
CO110 - White River Field Office
CO120 - Kremmling Field Office
CO130 - Grand Junction Field Office
CO140 - Glenwood Springs Field Office
CO150 - Uncompahgre Field Office
CO160 - Gunnison Field Office
CO172 - San Juan Field Office
CO200 - Royal Gorge Field Office
CO210 - La Jara Field Office
CO220 - Saguache Field Office
CO930 - Colorado State Office
ES??? - Rolla Resource Area
ES??? - Jackson District Office
ES??? - Milwaukee Field Office

ES930 - Eastern States Office
ID074 - Idaho Falls Field Office
ID075 - Pocatello Field Office
ID076 - Shoshone Field Office
ID078 - Burley Field Office
ID079 - Craters Of The Moon Nm
ID084 - Challis Field Office
ID085 - Salmon Field Office
ID086 - Coeur D'alene Field Office
ID087 - Cottonwood Field Office
ID095 - Four Rivers Field Office
ID096 - Owyhee Field Office
ID097 - Jarbidge Field Office
ID098 - Birds Of Prey Nca
ID930 - Idaho State Office
MT010 - Billings Field Office
MT020 - Miles City Field Office
MT030 - North Dakota Field Office
MT040 - South Dakota Field Office
MT050 - Dillon Field Office
MT06? - Havre Field Office
MT060 - Lewistown Field Office
MT070 - Butte Field Office
MT090 - Malta Field Office
MT092 - Glasgow Field Station
MT100 - Missoula Field Office
MT930 - Montana/Dakotas State Office
NM??? - Amarillo Field Office
NM010 - Albuquerque Field Ofc
NM011 - Cuba Field Office
NM012 - Grants Field Station
NM018 - Taos Field Office
NM030 - Las Cruces District Office
NM040 - Tulsa Field Office
NM050 - Socorro Field Office
NM060 - Roswell Field Office
NM070 - Farmington District Office
NM080 - Carlsbad Field Office
NM930 - New Mexico State Office
NV??? - Palomino Valley
NV010 - Elko Field Office
NV020 - Winnemucca Field Office
NV030 - Carson City Field Office
NV040 - Ely Field Office
NV050 - Las Vegas Field Office
NV060 - Battle Mountain Field Ofc
NV065 - Caliente Field Station
NV065 - Tonopah Field Station

NV930 - Nevada State Office
OR??? - Baker Resource Area
OR??? - Klamath Falls Resource Area
OR??? - Central Oregon Ra
OR??? - Tillamook Resource Area
OR??? - Wenatchee Resource Area
OR010 - Lakeview District Office
OR010 - Fillmore Field Office
OR020 - Burns District Office
OR030 - Vale District Office
OR050 - Prineville District Office
OR080 - Salem District Office
OR090 - Eugene District Office
OR100 - Roseburg District Office
OR110 - Medford District Office
OR120 - Coos Bay District Office
OR130 - Spokane District Office
OR930 - Oregon State Office
TC200 - National Training Center
UT020 - Salt Lake Field Office
UT030 - Escalante Interagency Resource Center
UT030 - Grand Starcase-Escalante Ntnl Monument
UT040 - Cedar City Field Office
UT052 - Richfield Field Office
UT055 - Henry Mountains Field Station
UT060 - Moab Field Office
UT070 - Price Field Office
UT080 - Vernal Field Office
UT090 - Monticello Field Office
UT100 - St. George Field Office
UT110 - Kanab Field Office
UT930 - Utah State Office
WO230 - Fish, Wildlife, And Botany Group (Wo-230)
WY010 - Worland Field Office
WY020 - Cody Field Office
WY030 - Rawlins Field Office
WY040 - Rock Springs Field Office
WY050 - Lander Field Office
WY060 - Casper Field Office
WY070 - Buffalo Field Office
WY080 - Newcastle Field Office
WY090 - Kemmerer Field Office
WY100 - Pinedale Field Office
WY930 - Wyoming State Office

APPENDIX 7. REFERENCES

Brown, AHD & Marshall, DR (1995). A basic sampling strategy: theory & practice. In Collecting Plant Genetic Diversity, Eds. L Guarino, V Ramanatha Rao & R Reid. CABI.

Bridson and Forman (1998) The Herbarium Handbook, Third Edition, edited by Diane Bridson and Leonard Forman, RBG Kew, UK.